

ITEMS

VOLUME 8 • NUMBER 3 • SEPTEMBER 1954
230 PARK AVENUE • NEW YORK 17, N. Y.

THE UNDERGRADUATE SOCIAL SCIENTIST

by Robert N. Wilson

INCIDENTAL to the administration of the Social Science Research Council's program of undergraduate research stipends,¹ college juniors interested in social science have contributed autobiographical information. The data are contained in the applications for stipends, which enable selected students to devote the summer between their junior and senior years to social science research under faculty guidance. On the application forms the candidates are asked for standard personal information. Our particular interest here is in short autobiographies that the students compose in an effort to trace their own intellectual development.² Applications are not entirely the result of the students' interest in performing research: since under the terms of the program each student must work fairly closely with a faculty supervisor, part of the initiative undoubtedly comes from the encouragement given by teachers to promising undergraduates.

The present selection includes 153 students from over 100 colleges and universities. The caliber of the students is high; most of them are highly recommended by their teachers and stand near the top of their college classes—as juniors their average grades are B+ or A—.

Although the applicants are all juniors, there is wide variation in the degree of sophistication and maturity

apparent in their writing.³ They range from individuals who are already doing the equivalent of graduate work, with considerable knowledge of a special field, to those who have been excited by an elementary course in sociology or psychology and view social science as a fresh new world. One may assume that some of the variation stems from differential abilities and rates of growth; yet some should probably be attributed also to the types of academic environment prevailing at the 100 institutions, which were very diverse as to size and breadth of view. Forty percent of the applicants were in institutions that are members of the American Association of Universities, 34 percent in small liberal arts colleges, and 26 percent in universities not members of the A.A.U. Two thirds of the total sample were males and one third, females.

At this early stage in their careers 70 percent of all candidates indicated a definite vocational choice in a social science discipline; others were wavering between alternatives such as clinical psychology and psychiatry, or law and political science. This high proportion is obviously subject to the attrition of decisions to be made in the senior year; and it is presumably swollen by the natural inclination of candidates to evince a strong desire for future work in social fields when applying for a Social Science Research Council award.

¹ This program was initiated in the spring of 1953, as described in *Items*, March 1953, pp. 7-9.

² The statements are in response to this requirement: "An autobiographical sketch of not more than 1,200 words, stressing those factors in your personal background and experience which have affected the development of your intellectual interests, and mentioning particular persons or events which have been most influential. The sketch should conclude with a statement of the rewards you hope to derive from your future career, and your reasons for choosing a particular vocation or alternative vocations."

³ One should perhaps mention here the generally poor quality of the research proposals and the autobiographical sketches as specimens of writing. Sentence structure is a deep mystery to a surprising proportion of these students; spelling tends to be highly original. At best, very few have anything resembling style. These deficiencies certainly have implications for American education in general (this is, after all, an elite sample), and for social science in particular, since social scientists of the present generation are not noted for literary grace or sensitivity in the use of the English language.

The socioeconomic levels represented in the students' backgrounds do not appear to be as varied as one might expect. However, the only index of this characteristic is found in the statement of "father's occupation." This single item is notoriously unreliable, as students of social stratification aver, unless a full description of just what the father does for a living can be obtained from the respondent. A favorite example is the term "engineer," which may refer to anyone from a repairman to the dean of a professional school. With this caveat, however, the distribution of parental occupations is striking:

Father's occupation	Percent of applicants
Professional, managerial (doctor, lawyer, professor, business executive)	46
Minor executive, small business proprietors	28
White collar and skilled labor (bookkeeper, clerk, machinist)	17
All others (unskilled labor; indeterminate)	9

It would be hazardous to generalize from these data, but it is likely that the extreme variety that has been noted in the origins of the current "younger generation" of social scientists (aged 25-40) was an artifact of World War II and Public Law 346, and that the college population is reverting to a "normal" inverted pyramid of parental occupations.⁴

Many persons are mentioned by the undergraduate applicants as having been influential in their intellectual development. In some instances such persons seem to serve as models, to provide a pattern for the student's emulation. In others they have given specific advice or encouragement. The following percentages of students mention each of several categories of "influence" (the

total is more than 100 percent, since most students mention more than one significant person):

Important influences	Percent
College teachers	53
Younger professors	31
Older professors	22
Father	42
High school teachers	39
Mother	26
Peers	15
Siblings	14
Other relatives or family friends	17

It seems clear that college professors are most often perceived as a strong influence pushing students toward an academic or scientific career, and that fathers and high school teachers come next. However, if one were to rate the references on a scale of magnitude based on the feeling-tone and the amount of detail given by the student, high school teachers would probably be found in the top position. The fondness and sense of intellectual debt displayed when writing of these teachers are impressive. If they are as potent in recruiting scholars as these data suggest, then recruitment policy in the social sciences should include winning the active participation of secondary school teachers.

Few children and not many adults have any precise conception of the social scientist's role; a boy's thoughts of a future career are far more likely to be focused on fire fighting or surgery or courtroom forensics than on anthropological research. As the student develops, his picture of the doctor and lawyer, as of the butcher and baker, becomes fuller and more realistic. But his picture of the social scientist usually remains vague, if indeed it is a picture at all, until well along in his undergraduate years. The "public image" of the social sciences may encompass anything and everything from statistics to settlement houses. At any rate, the behavioral fields are not included in most high school curricula, and students have no way of knowing what social scientists do. This situation accounts at least in part for the fact that recruits commonly embrace the social sciences late in a succession of career choices. Their new commitment to social science does not, of course, preclude a continuing interest in other disciplines, but chronologically these have usually preceded the current concentration of interest. The following proportions of the present group of undergraduates evince intellectual interest in other fields along with that in social science, but the percentages are not precise, since the histories vary in detail and only strong devotions are generally recorded:

Field of concurrent interest	Percent
Humanities	23
Physical and natural sciences	17
Art	12
Mathematics	7

⁴Data from the colleges on this point would be extremely enlightening. Several studies have contended that before World War II there was a pronounced concentration of opportunity for higher education. Students whose fathers held executive and professional positions had a distinct advantage in chances for entering college (and staying there) over those from less favored backgrounds. In a relevant study of the progress of 2,158 Pennsylvania schoolboys from the sixth to thirteenth grades, Sibley reports: "At the ninth grade and at the twelfth grade level, father's status has less influence than intelligence or educational opportunity but at the college level, the situation is sharply reversed. While the most intelligent boys have only a 4 to 1 advantage over the least intelligent, the sons of men in the highest occupational category enjoy an advantage of more than 10 to 1 over those from the lowest occupational level." (Elbridge Sibley, "Some Demographic Clues to Stratification," *American Sociological Review*, June 1942, p. 330.)

Few comparable data have come to our attention for the years immediately following World War II, or for the current population. Mulligan found that, in 1947, "white-collar" (professional, business, and clerical) occupations of fathers were overrepresented among students at Indiana University in comparison with the total population of Indiana. This was true of both veterans and nonveterans. However, the G.I. Bill of Rights had increased the proportion of students from the lower socioeconomic groups by more than 60 percent over the prewar period. See Raymond A. Mulligan, "Socio-Economic Background and College Enrollment," *American Sociological Review*, April 1951, pp. 188-196.

The data seem to confirm the impression that many graduate students of social science are drawn from undergraduate majors in the humanities. Also, there is an overlap between the social sciences and the humanities, with history straddling the categories. Perhaps the relatively slight involvement with mathematics is most striking, especially at a time when quantitative techniques are of increasing importance to social science.

There are several recurrent threads in the autobiographical sketches which, while not readily susceptible to quantitative treatment, do add to the portrait of the undergraduate social scientist. Certainly there is no single type of student who is destined only for social science; a healthy variety of backgrounds and interests is apparent. Yet an unmistakable clustering of characteristics marks those individuals who look forward to a career concerned with the study of human behavior.

MOBILITY OF STUDENTS' FAMILIES

The data are insufficient to judge the degree of vertical mobility of the students' families. However, the prevailing tone of the sketches indicates that most have been upwardly mobile, and this is perhaps further confirmed by the many cases in which the student's father did not himself attend college. One encounters many reflections of the classic American mobility pattern: the child is urged toward higher education so that he may obtain the advantages his father never had.

Residential mobility is a frequent subject of discussion in the autobiographies. Since this type of mobility is common in the United States, it would be hazardous to maintain that the families of nascent scientists have been unusually mobile. What is remarkable is the emphasis put on mobility by the students themselves. They often invoke it as an explanation of their adaptability, emancipation from regional ways of thinking, and "interest in people." They maintain that shifting their residence has broadened their perspectives and shaken them from a rut of neighborhood complacency. It may be hypothesized that one element in the fund of experience that sensitive social scientists bring to their work is direct knowledge of a *variety* of places and people. Perhaps the future social scientist has been an unusually keen participant observer from quite early in life.

EXTRACURRICULAR INTERESTS

Contrary to popular folklore about academic life, these students exhibit a great diversity of vigorous interests. They are not in the least "sicklied o'er with the pale cast of thought"; indeed, if anything their vitality and extreme diffusion of activities make the reader

pause to wonder how they manage to squeeze high scholarship into their eventful lives. Success and social recognition, as measured by club offices and memberships, are present in large measure. The stereotype of the social misfit who retires from the confusion of the real world into a more orderly world of books simply is not substantiated by these autobiographies. It is not at all unusual to find extracurricular work in dramatics and music, or some other form of creative activity, combined with holding office in organizations devoted to study of international affairs, or student government. In the language of sociometry, the students are more nearly "stars" at the center of a social fabric than "isolates" at the fringes. Several note that in later college years they have been forced into a deliberate contraction of their activities, in order to preserve enough time for serious academic work. The tendency to be involved in a network of social relations, which is so pronounced among these students, is paralleled by Roe's⁵ finding that social scientists, in contrast with other scientists, were far more given to attending parties and indulging in other social activities.

The single aspect of undergraduate experience which seems to have been relatively unemphasized is athletics. However, a good bit of participation in intramural sports is evident, and some of the men are varsity athletes.

ALTERNATIVE VOCATIONAL POSSIBILITIES

As implied in the earlier discussion of intellectual interests in other than social science fields, a "searching" behavior characterizes undergraduates. Perhaps sooner than most students, these potential social scientists have begun to make a rather sober appraisal of their vocational interests. Nearly all seem to have several plausible career lines. On the basis of ability alone, many could easily fit into a prescribed professional or business regimen. But something restrains them from making such commitments, gnaws at any tranquility of decision, and sustains their discontent with the standardized, the routine, the conventional paths of effort. This "something" is a variable or set of variables about which little is known, although it is perhaps the core of the problem of recruitment for scientific careers. At any rate, the embryonic social scientist appears to reach a stage in his decision making where he is devoted to the full-scale pursuit of reliable knowledge, where he cannot reject the challenge to learn much more about the social world. It would be false to imply that the student under-

⁵ Anne Roe, *The Making of a Scientist* (New York: Dodd, Mead and Company, 1952), pp. 60-61.

goes some grand transformation into a dedicated scholar; rather, increasing experience whets his curiosity about the behavioral sciences to a point where some commitment, wholly conscious or not, is unavoidable.

The searching attitude is illustrated in the statement of a student who had spent several summers investigating various types of occupations through working in them. He hoped for several rewards from his future career. He wanted to make some contribution to society, namely, to be able to help people in some manner, and to attempt the achievement of something lasting. He also wanted his career to offer intellectual challenge, and to require and supply humanitarian elements. Secondary considerations were community status and financial reward sufficient to raise a family and send his children to college. From his experience in the business world, he did not believe that his objectives in a career could be fully satisfied in the pursuit of financial gain per se. On the basis of less experience with the professional world, it seemed more compatible with his goals. He had been thinking particularly of research, psychiatry, and law, and had arranged his college program to include as many of the prerequisites as possible for any of these, and perhaps others, such as social work and city planning. He was making his application in the hope of clarifying one aspect of the quandary in which he found himself.

In other autobiographies, too, intellectual challenge and the opportunity to advance social welfare loom large in importance; financial goals often are named second; sometimes a career such as law is professed to be chosen as a step toward service to the community or the general welfare. Summer jobs have frequently been taken to gain experience in various fields of work, and seem to have fulfilled this purpose; the reactions are highly intelligent, and genuine efforts to weigh opportunities seem to be the general rule.

INITIAL INTEREST IN SOCIAL REFORM AND SUBSEQUENT SOPHISTICATION

As suggested above, certainly a majority of the students expressed a strong drive toward social amelioration. The desire to change the world for the better and "solve" social problems seems to have been an energizing force providing the first impetus for serious study. It almost appears that a reformist zeal is essential to keep a neophyte interested long enough for him to be intrigued by a more scientific attraction.

If one considers, for instance, Allport's⁶ theory of the "functional autonomy of motives," the following se-

⁶ Gordon W. Allport, *Personality: A Psychological Interpretation* (New York: Henry Holt and Company, 1937), Chapter 7.

quence may be postulated: A young student grows in his awareness of human ills; he is discouraged or outraged, presumably both, by men's irrational and self-defeating behavior, both individual and social; he is stirred by a vivid sense of injustice (often reflected in the intense undergraduate interest in problems of minority groups); he finds that serious disciplines exist for the study of the factors involved in social and individual disorganization; he is infected with an "alarm bell in the night" ideology—something must be done about these things right away; the perusal of social science literature makes him initially very optimistic, since he feels we need only apply what we know to produce a brave new world tomorrow morning; as time passes and sophistication increases, he discovers that social change is a rather complicated process, and that our knowledge of human behavior is both scarce and inexact; he then decides that the serious scholarly pursuit of verified knowledge is more far-reaching in its consequences than most of the "activist" alternatives; he may eventually become somewhat disenchanted with the idea of immediate reform, somewhat enchanted with the idea of scientific seeking of truth; at length, his motivation to learn social science has been transformed from a pragmatic zest in the interest of rebuilding the universe to a commitment to science for science's sake. The desire to learn, to experiment, to observe has become functionally autonomous; the student keeps on being a scientist because the vocation has become in itself much more satisfying than any other, not because he thinks he can at once better human conditions. He may often come to agree with Homans: "There is only one paramount reason for studying anything but the multiplication table. Either you are so interested in a subject that you cannot let it alone, or you are not. In the end, it is a matter of intellectual passion."⁷

One is tempted to infer that in social science ontogeny recapitulates phylogeny. Undergraduate students in sociology, for example, seem to move through stages from naive reformist tendencies to genuine scientific devotion, much as the discipline itself has moved from the emphasis on amelioration in the early 1900's to the present relatively objective emphasis on research. The undergraduates of the present sample are found in various places along this hypothesized sequence, most of them falling closest to the "reform" stage.

SELF-FULFILLMENT AS AN AVOWED GOAL

As talented undergraduates these students look forward quite justifiably to interesting and useful lives.

⁷ George C. Homans, *The Human Group* (New York: Harcourt, Brace and Company, 1950), p. 2.

They are eager to expand their personal resources, to use their abilities in a challenging, complex task. And so they give great weight to the ideal of rich self-fulfillment and maximum exercise of their talent. Coupled with this desire are strong drives for achievement and autonomy: to do something recognizably significant and to have optimal freedom from restraint while doing it. The flexibility and vitality which seem to characterize these "open" personalities are complemented by an abiding curiosity about human beings. This constellation of rather fugitive qualities is not easy to demonstrate by precise evidence; it is, rather, an image built up in the writer's mind by long immersion in the personal documents of undergraduates. A few truncated comments, however, may carry the flavor:

I feel summer camp experiences added much to my mental growth since I was completely removed from the home and put into situations which demanded self-made decisions.

I want to work in a field which presents challenges in terms of personal satisfaction and in terms of a world need.

I think that a vocation which will give me a chance to be creative and to have a sense of achievement and satisfaction is necessary if I'm to be a complete person.

It is my philosophy that one's career, as much as is possible, should be governed by one's interests, and I feel that in government, I would not only satisfy my own ambitions but also contribute to a function necessary in our democracy.

What I really wanted in life was a way of life from which I could derive intrinsic satisfaction, that is satisfaction from the

work itself, and feel in addition that somehow my work was contributing to the amelioration of mankind.

CONCLUSION

The findings from this small sample are of course only suggestive, but they do indicate that we may anticipate certain isolable patterns in this proto-professional group. Social scientists are apt students of the sociology and psychology of many other vocations, and it is perhaps time to heed the dictate, "know thyself." Well-planned research directed toward defining the genus social scientist would include adequate samples, intensive and extensive interviewing, and exploration of personality variables. A longitudinal design is essential so that students may be followed from undergraduate days well into their professional careers. Only thus can we begin to build the sociology of social science, and to attack the chore well-stated by Thurstone: "... there is no question that the creative talent in our population is one of our principal national assets. It is high time for us to do something aggressive in the identification of creative talent in various forms and in the subsequent training and encouragement of such talent."⁸

⁸L. L. Thurstone, "Criteria of Scientific Success and the Selection of Scientific Talent," paper prepared for a conference called by the Advisory Committee on Fellowship Selection of the National Research Council, held in Washington, D. C., November 14, 1953.

PSYCHOLINGUISTICS: A SKETCH OF THE AREA AND SOME ACTIVITIES OF THE COUNCIL'S COMMITTEE ON LINGUISTICS AND PSYCHOLOGY*

ONE of the few things on which social scientists seem to be agreed is the importance of language in nearly all phases of human activity. Language is, of course, a social product. It is a learned system of symbolic behavior which depends directly upon other speaking organisms for its model and for the rewards of its use. It both shapes and is shaped by the individual and social behavior of man. Indeed, the characterization of man as *homo sapiens*, the thinking animal, is less apt than describing him as *homo loquens*, the talking animal—

for upon this activity most exclusively human behaviors depend.

It is not surprising therefore to find workers in diverse fields studying a wide variety of aspects of language, its structure, production, acquisition, transmission, reception, and effects. It is surprising, however, to find that these specialists, with the exception of a few rare spirits like Edward Sapir, have worked in relative isolation from each other. This has been largely a consequence of historical accident, of the segregation of individuals by academic departments and divisions, and the pressure of keeping up with one's own specialty itself, although occasionally it has been by design, as in the case of Leonard Bloomfield's edict to his colleagues that the study of language can be pursued without ref-

* The present members of this committee are John B. Carroll (chairman), James J. Jenkins, Floyd G. Lounsbury, Charles E. Osgood, Thomas A. Sebeok, and Rulon S. Wells, 3rd. Joseph B. Casagrande serves as staff. Former members include Joseph Greenberg and George A. Miller.

erence to any one psychological doctrine.¹ In recent years there has been a growing feeling that specialization has proceeded so far and so fast that it has made integration a real and pressing problem. Partly as a result of natural communities of interest in new developments like information theory and partly as a result of systematic search, common grounds for understanding and joint effort have been emerging among some of these disciplines. One area of convergence has been in the midground between psychology and linguistics.

WHAT IS PSYCHOLINGUISTICS?

According to the very general model provided by information theory, there is communication whenever one system, a *source*, influences another system, a *destination*, by selecting among the possible signals that can be carried in a *channel* connecting them. The process whereby states of the source are transformed into signals that can be carried in the channel is called *encoding*, and the process whereby these signals are transformed back into a form that can be handled by the destination is called *decoding*. To adapt this model to the requirements of human communication via natural languages, we must take into account two facts: (1) The human communicator functions more or less simultaneously as source and destination—he regularly decodes the messages he himself encodes, for example, via auditory feedback mechanisms—and therefore we must conceive of each individual in the language community as functioning as a *communicating unit*, including receiving, mediating (destination/source), and transmitting operations. (2) Human communication is a *social process*; *message events*—reactions of one individual that produce stimuli for another—serve to connect human communicating units and form the basis for what may be called *essential communication acts*. These communication acts may either be *immediate*, as in face-to-face conversation, or *mediated* by means of writing, signal flags, musical recordings, and the like.

With this model in mind, the roles of the various disciplines concerned with human communication can be at least roughly indicated. Linguistics deals with the structure of messages as events independent of the characteristics of either speakers or hearers. Once language signals have been encoded and are “on the air,” so to speak, they can be objectively studied as physical phenomena in their own right. In an even stricter sense the linguist is concerned with the *code* of a given signal system, the sets of distinctions that are significant in differentiating alternative messages. Relying on the

human informant only for the simple judgment that two alternatives are or are not the same in meaning, the linguist starts with the infinitely variable sounds actually produced (phone sequences) and ends with a minimal number of necessary and sufficient classes of sounds (phonemes), the rules of their combination into morphemes (minimal sequences of phonemes having a meaning), and the rules of the combination of morphemes into utterances—the traditional subject matter of grammar.

Human communications constitute in some degree the basic data of all the social sciences, but it is psychology in particular that is concerned with the characteristics of human organisms that influence the selection and interpretation of messages—habits, meanings, motives, attitudes, values, roles, and so on. The rather new field of psycholinguistics deals, in the broadest sense, with relations between the structure of messages and the characteristics of the human individuals who produce and receive them, i.e., *with encoding and decoding by human communicators*. To put it less elegantly, psycholinguistics studies “why and how people select what they say” on the one hand, and “why and how people understand what they hear” on the other. Although the psycholinguist is primarily concerned with oral speech, written and other mediated communications also receive his attention. The more specialized fields of phonetics and psychoacoustics deal with the terminal phases of encoding and the initial phases of decoding respectively, that is, with the way in which speech sounds are produced and heard, and with their physical characteristics.

It is the particular task of psycholinguistics, in the judgment of the committee, to foster better understanding and cooperation between research workers, particularly (though not exclusively) in the fields of psychology and linguistics.

COUNCIL SEMINARS ON PSYCHOLINGUISTICS

The first formal effort of the Council in this area was the sponsorship of the Interuniversity Summer Research Seminar on Linguistics and Psychology held at Cornell University in 1951.² This seminar explored the relationships between psychology and linguistics and made recommendations regarding the development of overlapping areas. The group uncovered many important problems requiring the combined skills of the linguist and the psychologist but found, on the other hand, serious barriers to communication between the disciplines, lack

¹ Leonard Bloomfield, *Language* (New York: Henry Holt and Company, 1933), p. vii.

² For a report on this seminar, see John B. Carroll, “The Interdisciplinary Summer Seminar on Linguistics and Psychology,” *Items*, December 1951, pp. 40–42.

of awareness of the potentialities of joint research, little opportunity for cross education, and a dearth of information within each discipline about the other.

In an effort to deal with these problems, because of the growing interest in research on language behavior in the social sciences, the Council appointed a Committee on Linguistics and Psychology in October 1952, to plan and develop research in this interdisciplinary field. As a first important step the committee undertook the planning of the 1953 Interuniversity Summer Research Seminar on Psycholinguistics.

Building on the work and recommendations of the 1951 seminar, it was thought that the most fruitful approach to many research problems would be through examining them in the light of three current conceptual frameworks: (1) the linguists' conception of language as a structure of systematically interrelated units; (2) the learning theorists' conception of language as a system of habits; and (3) the information theorists' conception of language as a means of transmitting information. The 1953 seminar, which met at Indiana University in conjunction with the Linguistics Institute, explored these three frameworks, attempted to apply them jointly in the theoretical analysis of a variety of interdisciplinary problems, and sought to develop experimental approaches to the problems. The results of the seminar discussions have just been published as a monograph entitled *Psycholinguistics: A Survey of Theory and Research Problems*.³

It would be presumptuous, of course, to assert that this seminar had exhausted such a complex field in eight weeks, and the committee is well aware of the deficiencies and limitations in the report. For example, there is no adequate treatment of psychoacoustics, second-language learning, or the general nature of meaning. However, the report at least sketches the scope of psycholinguistics and illustrates its relevance to the social sciences as a whole. What follows is a brief abstract of the report, indicating the divisions of the field and giving illustrations of proposals for future research.

The research problems that were discussed by the seminar seemed to fall rather naturally into three general categories: *diachronic psycholinguistics*, dealing with changes in language behavior over time, both in the individual and in the speech community; *sequential psycholinguistics*, dealing with the organization of sequences in the stream of speech, both as produced and as received; and *synchronic psycholinguistics*, dealing with relations between momentary states or units of

messages and momentary states of communicators. Understanding of problems in all these areas was facilitated by simultaneous analysis from the viewpoints of linguistics, information theory, and learning theory.

DIACHRONIC PSYCHOLINGUISTICS

Perhaps the most fundamental diachronic problem is *first-language learning by the child* since this concerns the formation of basic decoding and encoding habits. At the level of perceptual skills the infant must learn to isolate those oft-repeated auditory forms that comprise words and trite phrases; we suspect that the child's analysis of speech into the constituent phonemes and morphemes of the linguistic code comes much later and in intimate connection with the development of encoding skills. On the motor output side the diffuse vocalizations characteristic of infants of all races and cultures shift rapidly toward frequency profiles of speech sounds characteristic of the parental language; the secondary reinforcing value of producing sounds like those of the parents, e.g., sounds associated with basic rewards, is operative here. The repetitious practice we call "babbling" serves further to integrate the syllabic skills that form the building blocks of larger units. The grammatical structure of any language, which Sapir referred to as its "unconscious patterning," provides a set of redundancies operating over larger segments of messages, and these redundancies also come to be reflected in the child's nervous organization as sets of anticipations (in decoding) and dispositions (in encoding). At the core of psycholinguistics lies the problem of meaning: linguistic signs must become associated with internalized symbolic, representational processes in order to terminate decoding, and these representational processes must in turn become associated with culturally standardized vocalizations if intentional encoding is to be initiated. Investigators in several fields are working on problems of language development at its various levels, from the acquisition of the appropriate motor skills to questions of concept formation and semantics.

An abrupt, usually traumatic change in language behavior in its several aspects can be observed in cases of *aphasia*, the loss or impairment of the power to use or understand speech. It seems reasonable that a theoretical model of language behavior adequate for the study of its development in the child might also shed light on this more dramatic change. Some research on this problem has already been done: the patterning of disturbances in classic aphasic cases—the types of performances that should be preserved or lost together—was predicted from theory and found to hold at a level far beyond chance. For many years linguists, psychologists, and

³ *Indiana University Publications in Anthropology and Linguistics*, Memoir 10, 1954 (203 pp., \$2.50); the report will also be distributed as a special supplement to the *Journal of Abnormal and Social Psychology*, Vol. 49, No. 4 (October 1954).

neurologists have been studying aphasia from their own viewpoints, and the time seems ripe for these specialists to join forces.

Other diachronic problems are *second-language learning* and *bilingualism*. Having become a practical expert in his own first language, the second-language learner seeks to establish working relations between his nervous system and a new code. Similarly, the bilingual must maintain within one nervous system two alternative sets of encoding and decoding habits, despite the potential interference. Sources of interference run the gamut from the microstructure of phonemic and syllabic skills to the macrostructure of motives and meanings; and the problems are quite different depending on whether the individual tends toward the *compound* type (dual code, single semantic system) typical of the schoolroom learner of a second language, who translates as he goes along, or the *coordinate* type (dual code, dual semantic system) typical of the "true" bilingual, who "thinks in the language."

Yet another diachronic problem is that of *language change in the culture*. Here the linguist, equipped with a vast supply of surprisingly regular facts as exemplified by Jakob Grimm's "law" of uniform phonetic correspondences between Germanic and other Indo-European languages, runs fully into the questions of "why" and "how" and hence into the arms of his social science colleagues. The learning theorist, with the aid of general principles about the execution of motor skills under emotional stress and about facilitation and interference among alternative responses at choice points, is able to make predictions about the *locus* of probable modifications, whether phonemic or morphemic, in the speech stream. He is also able to make statements about the *process* of change; for example, emotional stress or the presence of competing forms from another dialect may result in the production of lapses (particularly in children learning the language), hearers may then fail to correct lapses, particularly those that occur in positions of low information value, "errors" are thereby reinforced as parts of total communicative acts and subsequently become generalized to other positions in the speech stream, and so on.

The information theorist also makes an interesting contribution to problems of language change. Starting from the notion that a maximally efficient (if practically impossible) language would be one in which the number of *distinctive features* (minimum bases of contrast between phonemes, such as voicing versus nonvoicing) was just that required to distinguish the number of phonemes in the language, he proceeds to demonstrate that the efficiency of contemporary languages which have been studied averages about 50 percent, and that of

one language (Spanish) which has been studied over successive periods shows a cyclic variation about this same value. Natural languages, it seems, maintain a dynamic balance between efficiency and leniency; speakers tend to expand and elaborate articulatory features when the code becomes too difficult and to drop them when it becomes too easy or redundant.

SEQUENTIAL PSYCHOLINGUISTICS

Analysis of the sequential ordering of the stream of speech proves to be a happy meeting ground for linguists, learning theorists, and information theorists. The learning theorist views speech as a series of responses separated by choice or decision points. These choice points are analogous to the information theorist's notion of a system or set of alternatives. For the learning theorist, these alternatives are flexibly organized into what he calls "habit-family hierarchies," a set of alternative reactions to the same stimulus having varied habit-strength. The information theorist's *conditional entropy* (uncertainty of subsequent states, given knowledge of the antecedent state) provides a quantitative index of the nature of the hierarchy of responses. The particular hierarchy of alternatives operating at any moment, according to the learning theorist, depends upon the precise stimulus situation, including inputs from semantic, grammatical, and skill levels of language organization. The information theorist's notion of "higher-order Markov processes," in which selection of a larger unit serves to reload the probabilities of smaller, included units, is again analogous. Thus, selection by the speaker of a morpheme from the definite article category ("the" or "these") makes it more probable that the "th" phoneme, which is rare in other morpheme categories, will occur in an utterance. The linguist, using his own nonquantitative methods of analysis based on rules of distribution of the various elements of speech, segments utterances into their "immediate constituents," e.g., subject and predicate of English sentences, segments these in turn into *their* immediate constituents, and so on; he also ends with a hierarchal system of units within units.

The learning theorist predicts that transitions *within* units at any hierarchal level, as between the "s" and the "t" in "stop," should involve stronger habits (based on contiguity and frequency factors) than transitions *between* units, as between "stop" and "it" in "stop it!" Sufficiently fine measurements of latency or pause phenomena in sequential speech (latency being an index of habit strength) should therefore provide evidence for functional units of *encoding*. Preliminary observations suggest that the units arrived at in this way will cor-

respond to the syllable, the word, and the "semantic choice unit" (roughly equivalent to the phrase), which are *not* units arrived at through linguistic analysis. On the other hand, it seems likely that the functional units of *decoding* will correspond to the linguist's phoneme, morpheme, and function class. Although the research remains to be done, it also seems probable that the "entropy profiles" of information theory analysis (entropy estimates for a series of units in sequential speech) will correspond to these functional psycholinguistic units, points of low transitional probability or high uncertainty corresponding to the points of long latency, and possibly to the boundaries between units as linguistically defined.

The *word association technique* is another tool for studying the sequential structure of language. When a group of subjects hear a stimulus word and respond with the first words (other than the stimulus word) that occur to them, a hierarchy of alternative responses appears. These hierarchies based on group data, i.e., cultural phenomena, usually reflect the association structures of individuals, as is shown by the correlation between group frequencies and individual latencies and by the fact that commonly associated words mixed up in long lists typically are recalled by individual subjects in pairs. Both semantic and formal (linguistic) determinants contribute to word association. The semantic are demonstrated by the meaningful relatedness of stimulus words and response words in most instances, as well as by the fact that in continuous sequential associating from the same "pool" (e.g., four-legged animals) clusters of semantically related items (e.g., giraffe, antelope, zebra, hartebeest) occur as rapidly given bursts. The linguistic determinants are shown, for example, by the way in which changing the form-class of the stimulus word, say from singular to plural, can call forth a whole series of equivalent changes in the responses. Perhaps the most striking evidence of the effect of culture upon processes of association appears in recent data on two groups of college undergraduates, comparing norms in about 1910 with new norms for standard and familiar stimulus items; for almost every item, the new norms display greater *stereotypy*.

SYNCHRONIC PSYCHOLINGUISTICS

Problems falling in this area range from the molecular, e.g., the psychological reality of the phoneme, whether or not phonemes as perceived by the individual are isomorphic with their physical properties, to such broad questions as the relations between language, thought, and culture.

It is necessary to think of the total message exchanged

between communicators as being comprised of several parallel and simultaneous bands. Within the *vocal-auditory band* itself, there are other continuously coded speech phenomena which are not usually included in a linguistic analysis. These "voice qualifiers," including characteristic timbre, pitch, stress, tempo, and the like, may be idiosyncratic or general throughout a speech community, and may carry significant information about the speaker's status, emotional state, and so on. There is also the *gestural-visual band*: the swift play of facial, manual, and postural movements which typically accompany and supplement vocally coded information but which may also be in deliberate contrast, as in sarcasm and irony. As a matter of fact, facial expressions and other gestures can be studied as a communication system in its own right, by methods analogous to those applied by psycholinguists to the vocal-auditory band. Some work along these lines has been done by both linguists and psychologists. Finally, there is the *manipulative-situational band*, ranging from formally coded orthographic systems such as alphabetical or hieroglyphic writing to informally coded systems of aesthetic media as represented by painting, music, and the dance, and including the communication exemplified by putting food before the hungry man or hanging a piece of mistletoe to trap the unwary miss. Just as there may be sequential redundancy in linguistically coded messages, so there may be synchronic redundancy between these parallel bands, as in the commonplace example of accompanying the vocal command, "come here," with a gesture. A major psycholinguistic problem is to determine what states of communicators (e.g., emotional states of elation, aggression, and the like) are related to identifiable components of messages being carried in these multiple bands.

On the broader level of synchronic psycholinguistics we are interested in problems like the following: How do the motivational states of speakers and hearers influence their production and reception of messages? Learning theory analysis of the effects of increased drive upon competing habits leads to the clear prediction that both encoding and decoding processes should become relatively stereotyped under heightened motivation, that is, speakers should tend to select high probability sequences and hearers should tend to misperceive and misinterpret in terms of dominant expectancies. Experiments along these lines have been proposed, including analysis of the effects of varying states of anxiety in clinical patients upon their vocal output in therapeutic interview situations.

Perhaps the most inclusive question that can be asked in this area is to what extent and in what ways does the structure of a language influence the thought processes,

perceptions, cognitions, and even philosophies of its users, the so-called *Weltanschauung Problem*. Analysis of this problem has been largely from the perspective of linguistics alone. Theories, such as those propounded by Benjamin Whorf, Dorothy Lee, and their followers, on the influence of a language on the thought processes of its speakers have been highly provocative and have served well to define the problem. However, the evidence adduced in support of them is derived from linguistic materials exclusively, with the result that the argument is essentially circular. In the committee's view a psycholinguistic approach to the *Weltanschauung Problem*, rather than a unilateral approach by either linguists or psychologists, makes it possible both to identify and avoid such methodological pitfalls and to formulate hypotheses for experimental testing.

PLANS FOR FUTURE WORK

The members of the Committee on Linguistics and Psychology consider that its work to date, particularly the planning of the 1953 summer seminar and the preparation of its report, has given them a clearer view of both the nature of psycholinguistics and the problems within it that are challenging and amenable to research. Two specific lines of development are envisaged as desirable next steps in a program to advance research in this field: (1) the organizing and sponsoring of work conferences on specific research problems; (2) the design and execution of a major cross-cultural experimental investigation into the interrelationships among language code, thought, and culture.

The work conferences are viewed as opportunities for small groups of investigators, often from different specialties, to work intensively for a few days on specific problems of limited scope but of high potential fruitfulness in terms of the present status of the field. One such conference, on second-language learning and bilingualism, has already been held under the chairmanship of Uriel Weinreich of Columbia University. The participants included psychologists, linguists, anthropologists, and second-language teachers. Two additional work conferences are scheduled to be held during 1954-55: one on contemporary research on word association, its implications and applications, and the other on tech-

niques of content analysis, including critical evaluation of existing techniques, proposals for new techniques, and their potential application in fields of folklore, literature, and propaganda analysis. Other research problems that seem to the committee to be ready for intensive discussion are psycholinguistic theory in relation to aphasia (of interest to neurologists, linguists, and psychologists), child language (in its linguistic, psychological, and developmental aspects), and speech decoding and the psychology of perception (of interest to specialists in both psychoacoustics and perception theory, as well as linguists).

It is the unanimous opinion of the committee that philosophical discussions of the *Weltanschauung Problem* have exhausted their usefulness. On the other hand, it is thought that hypotheses can be formulated in this area, and that definitive cross-cultural observations and experiments can be designed to test them in the field. Intensive collaboration among linguists, cultural anthropologists, and psychologists would be required to carry out such an undertaking effectively. A team of graduate students would also be needed, first to be trained in the joint linguistic, anthropological, and psychological skills essential to such research and then to collect data in the field. To factor out the contributions of both language and culture, groups speaking a common language but having varied cultures and groups speaking varied languages but having a common culture would be essential. The American Southwest is one region where well-known populations meeting these requirements would be available. Experimental observations would be made on the effects of codification upon cognitive functions like perception, recall, and problem solving, on ease of communication about standard sets of concrete events, on semantic factor structure, etc. The same controlled observations would be made in all groups, so that comparisons could be made across performances as well as across languages and cultures. During the coming year the committee will explore in detail the rationale for this kind of integrated research, including the design of experiments, training problems, and the limitations and opportunities of field study of those problems, with the aim of making definite proposals along these lines.

PERSONNEL

DIRECTORS AND OFFICERS OF THE COUNCIL

At the annual meeting of the board of directors of the Council held in September, Frank C. Newman of the University of California, Schuyler C. Wallace of Columbia University, Ralph J. Watkins of Dun and Bradstreet, Inc.,

and Donald Young of the Russell Sage Foundation were elected directors-at-large for the two-year term 1955-56.

S. S. Wilks of Princeton University was elected chairman of the board of directors; Fred Eggan of the University of Chicago, vice-chairman; Gordon A. Craig of Princeton Uni-

versity, secretary; and Ernest R. Hilgard of Stanford University, treasurer. The following members of the board were elected as its Executive Committee: Schuyler C. Wallace of Columbia University (chairman), Carroll L. Shartle of Ohio State University, Mortimer Spiegelman of the Metropolitan Life Insurance Company, Gordon R. Willey of Harvard University, and Donald Young of the Russell Sage Foundation. Douglas McGregor of the Massachusetts Institute of Technology was named chairman of the Committee on Problems and Policy; and V. O. Key of Harvard University and Donald G. Marquis of the University of Michigan were elected members of the committee for three-year terms. The other members of this committee are Roy F. Nichols of the University of Pennsylvania, Joseph J. Spengler of Duke University, Malcolm M. Willey of the University of Minnesota, and ex officio: Pendleton Herring, S. S. Wilks, and Fred Eggan.

APPOINTMENTS TO COUNCIL COMMITTEES

Blair Stewart of Oberlin College has been renamed chairman of the Committee on Faculty Research Fellowships for the year 1954-55. Lyle H. Lanier of the University of Illinois, Emmette S. Redford of the University of Texas, and John W. Riley, Jr. of Rutgers University are newly appointed members; and Paul W. Gates of Cornell University, Harold E. Jones of the University of California, and Malcolm M. Willey of the University of Minnesota have been reappointed to the committee.

George W. Stocking has been renamed chairman of the Committee on Grants-in-Aid for 1954-55. M. Margaret Ball of Wellesley College and Robert E. L. Faris of the University of Washington have been designated members of the committee. Reappointed for the year are Richard S. Crutchfield of the University of California and Edward C. Kirkland of Bowdoin College.

Earl Latham of Amherst College has been reappointed chairman of the Committee on Social Science Personnel, which has charge of the Council's research training fellowship program. Also reappointed for the year are the other members of the committee: Harry Alpert of the National Science Foundation, Ralph L. Beals of the University of California at Los Angeles, Richard B. Heflebower of Northwestern University, John H. Rohrer of Tulane University, and Paul Webbink of the Social Science Research Council.

E. Adamson Hoebel of the University of Minnesota has

been named chairman of the Committee on Undergraduate Research Training, which administers the Council's program of undergraduate research stipends and first-year graduate study fellowships. Wilbert J. McKeachie of the University of Michigan and Everett K. Wilson of Antioch College are newly appointed members; and R. F. Arragon of Reed College, Robert B. MacLeod of Cornell University, and Albert J. Reiss, Jr. of Vanderbilt University have been reappointed to the committee.

W. M. McPherson of North Carolina State College has been appointed secretary of the Committee on Agricultural Economics, succeeding Lee R. Martin.

George W. Stocking of Vanderbilt University has been named a member of the Committee on Business Enterprise Research.

Bert F. Hoselitz of the University of Chicago has been appointed a member of the Committee on Economic Growth.

Neil W. Chamberlain of Columbia University has been designated a member of the Committee on Labor Market Research.

John B. Carroll of Harvard University has been named chairman of the Committee on Linguistics and Psychology, succeeding Floyd G. Lounsbury who remains a member. Rulon S. Wells, 3rd, of Yale University has been newly appointed to the committee.

The former Subcommittee on Child Development of the Committee on Social Behavior has been appointed a Committee on Personality Development, with Alfred L. Baldwin of Cornell University serving as chairman. The other members are David F. Aberle of the University of Michigan, William E. Henry of the University of Chicago, Robert R. Sears of Stanford University, and John W. M. Whiting of Harvard University.

Alexander Heard of the University of North Carolina has been named a member of the Committee on Political Behavior.

Donald Young of the Russell Sage Foundation has been appointed a member of the Committee on Preventive Medicine and Social Science Research.

James S. Tyhurst of McGill University and Edmund H. Volkart of Stanford University have been appointed members of the Committee on Psychiatry and Social Science Research.

Donald G. Marquis of the University of Michigan has been named chairman of the Committee on Social Behavior.

PUBLICATIONS

COUNCIL BULLETINS AND MONOGRAPHS

The Social Sciences in Historical Study: A Report of the Committee on Historiography, Bulletin 64. July 1954. 191 pp. Paper, \$1.75; cloth, \$2.25.

Research on Labor Mobility: An Appraisal of Research Findings in the United States, Bulletin 65, by Herbert S. Parnes. October 1954. About 220 pp. \$1.75.

Labor Mobility in Six Cities: A Report on the Survey of Patterns and Factors in Labor Mobility, 1940-1950,

by Gladys L. Palmer, with the assistance of Carol P. Brainerd, for the Committee on Labor Market Research. June 1954. 192 pp. Paper, \$2.25; cloth, \$2.75.

Adjustment to Physical Handicap and Illness: A Survey of the Social Psychology of Physique and Disability, Bulletin 55, revised, by Roger G. Barker, in collaboration with Beatrice A. Wright, Lee Meyerson, Mollie R. Gonick. April 1953. 456 pp. \$2.00.

OTHER BOOKS

America's Resources of Specialized Talent: The Report of the Commission on Human Resources and Advanced Training, prepared by Dael Wolfe. New York: Harper & Brothers, September 1954. 350 pp. \$4.00.

Labor Mobility and Economic Opportunity. Related Essays by E. Wight Bakke, Philip M. Hauser, Gladys L. Palmer, Charles A. Myers, Dale Yoder, and Clark Kerr, with a Preface by Paul Webbink. Sponsored by

the Committee on Labor Market Research. Cambridge: The Technology Press, and New York: John Wiley & Sons, July 1954. 125 pp. \$3.50.

Civil-Military Relations: An Annotated Bibliography, 1940-1952. Prepared under direction of the Committee on Civil-Military Relations Research. New York: Columbia University Press, May 1954. 154 pp. \$2.00.

The Council's bulletins, monographs, and pamphlets are distributed from the New York office of the Council.

ANNOUNCEMENT

The Council will again offer in 1955 the several types of fellowships, grants, and other awards made in the present year. In addition, it will sponsor two institutes in mathematics for social scientists in the summer of 1955 and administer two new programs, fellowships in legal philosophy and political theory, and grants for research in the history of American military policy. Applications for most awards should be filed not later than January 10, 1955. Circulars giving details of the offerings listed below are available upon request.

Research Training Fellowships, predoctoral and postdoctoral, for more advanced research training than that provided in the usual Ph.D. program; all Ph.D. requirements except the thesis must be met before tenure of a fellowship may begin, but application need not be deferred until that point has been reached.

Faculty Research Fellowships, for half-time support for research for three-year terms; open to college and university social science teachers, normally not over 35 years of age.

Undergraduate Research Stipends, open to college juniors, for supervised research during the summer and the ensuing senior year; appointees will be eligible to apply for first-year graduate study fellowships.

Fellowships in Legal Philosophy and Political Theory, predoctoral and postdoctoral, for advanced study and research in these fields; this program was inaugurated and administered last year by the Rockefeller Foundation.

Grants-in-Aid of Research, to aid scholars of established competence in meeting direct expenses of their own research projects; not open to candidates for degrees.

Grants for Research on History of American Military Policy, to support research on the military policies of the United States and related factors, in any period between

1750 and 1939 except the Civil War period; *applications for these special grants should be made before November 1, 1954*; this program is described in *Items*, June 1954, pages 13-15.

Institutes in Mathematics for Social Scientists, eight-week sessions in the summer of 1955 at the University of Michigan and at Stanford University; open to predoctoral and postdoctoral students and younger faculty members in social sciences who wish to improve their mathematical competence; a limited number will receive stipends.

Summer Research Training Institutes for intensive postdoctoral technical or interdisciplinary training in fields related to the primary interests and experience of groups of social scientists who present suitable proposals; this program is described in *Items*, June 1954, pages 17-18.

Interuniversity Summer Research Seminars, to bring together for intensive summer sessions small groups of younger social scientists, from several universities and one or several disciplines, who have a common interest in the theoretical or methodological development of a delimited topic; this program is described in *Items*, March 1954, pages 4-6.

Inquiries should be made as early as possible so that there will be ample time for preparation of definite applications before the closing dates. Except for inquiries concerning Interuniversity Summer Research Seminars, which should be addressed to the New York office of the Council, all communications and requests for application forms, which should indicate age, academic status, vocational aims, the nature of the proposed training or research, and the type of assistance desired, should be addressed to the Washington office of the Social Science Research Council, 726 Jackson Place, N.W., Washington 6, D.C.

SOCIAL SCIENCE RESEARCH COUNCIL

230 PARK AVENUE, NEW YORK 17, N. Y.

Incorporated in the State of Illinois, December 27, 1924, for the purpose of advancing research in the social sciences

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